AMENDMENTS TO THE CLAIMS

Claim 1 (currently amended): A riser reactor configured for a fluidized catalytic conversion process including hydrocarbon cracking reactions on hydrocarbons wherein the riser reactor has a riser reactor height and comprises a reactor bottom and further comprises in order from the reactor bottom:

a.) a prelift zone having a prelift zone diameter and a prelift zone height and containing catalytic cracking catalyst, and further adapted to lift catalytic cracking catalyst to a first reaction zone without cracking hydrocarbons in that prelift zone,

b.) [[a]] the first reaction zone having a substantially constant first reaction zone diameter and a first reaction zone height and containing catalytic cracking catalyst and adapted to accept pre-lifted catalytic cracking catalyst from the prelift zone and to react a hydrocarbon in the first reaction zone, and the ratio of the first reaction zone diameter to said prelift zone diameter is from about 1:1 to about 2:1 and the height of said first reaction zone is from about 10% to about 30% of the height of the riser reactor,

c.) a second reaction zone that is, in order from the reactor bottom, the next reaction zone having an iso-diameter, having a second reaction zone height and a second reaction zone diameter that is larger than the first reaction zone diameter and containing catalytic cracking catalyst, and is adapted to accept catalytic cracking catalyst and reacted hydrocarbons from the first reaction zone and the ratio of said second reaction zone diameter to said first reaction zone diameter is in the range of from about 1.5:1 to about 5:1 and the height of said second reaction zone is in the range of from about 30% to about 60% of the height of the riser reactor, and

d.) an optional outlet zone having an outlet zone diameter that is reduced with respect to the second reaction zone diameter.

Claim 2 (currently amended): The reactor of claim 1 wherein the total height of said prelift zone, said first reaction zone, said second reaction zone, and said optional outlet zone is in the range of from about 10 meters to about 60 meters.

Claim 3 (previously presented): The reactor of claim 1 wherein the diameter of said prelift zone is in the range of from about 0.02 meters and about 5 meters and the prelift zone height is in the range of from about 5% to about 10% of the height of the riser reactor.

Claim 4-5 (cancelled)

Claim 6 (currently amended): The reactor of claim 1 comprising said outlet zone and wherein the ratio of said ~~optional~~ outlet zone diameter to said first reaction zone diameter is in the range of from about 0.8:1 to about 1.5:1 and the height of said optional outlet zone is from about 0% to about 20% of the height of the riser reactor.

Claim 7 (previously presented): The reactor of claim 1 further comprising a first junction section between said first reaction zone and said second reaction zone, and wherein said first junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 30°~80°.

Claim 8 (currently amended): The reactor of claim 1 comprising said outlet zone and further comprising a second junction section between said second reaction zone and said outlet zone, and wherein said second junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 45°~85°.

Claim 9 (currently amended): A riser reactor configured for a fluidized catalytic conversion process including hydrocarbon conversion reactions on hydrocarbons flowing ~~substantially from a reactor bottom~~ through at least one reaction zone to produce converted hydrocarbons, the reactor having a substantially vertical linear axis, a riser reactor height, and the reactor bottom, and wherein the riser reactor comprises in order from the reactor bottom:

a.) a prelift zone having a prelift zone diameter and a prelift zone height,

b.) a first reaction zone having a first reaction zone diameter and a first reaction zone height wherein the ratio of the first reaction zone diameter to said prelift zone diameter is from about 1:1 to about 2:1 and the height of said first reaction zone is from about 10% to about 30% of the height of the riser reactor and wherein the first reaction zone is configured so that a hydrocarbon cracking reaction taking place in the first reaction zone takes place at higher reaction temperatures, higher ratios of catalyst to oil, and shorter reaction times than, respectively, a reaction temperature, ratio of catalyst to oil, and reaction time in a second reaction zone,

c.) the second reaction zone having a second reaction zone heighth and a second reaction zone diameter that is larger than the first reaction zone diameter and wherein the ratio of said second reaction zone diameter to said first reaction zone diameter is in the range of from about 1.5:1 to about 5:1 and the height of said second reaction zone is in the range of from about 30% to about 60% of the height of the riser reactor and wherein said second reaction zone is configured so that a hydrocarbon conversion reaction taking place in the second reaction zone takes place at lower reaction temperature, lower ratio of catalyst to oil, and longer reaction time than, respectively, the reaction temperature, ratio of catalyst to oil, and reaction time in the first reaction zone, and

d.) an outlet zone having an outlet zone diameter that is reduced with respect to the second reaction zone diameter.

Claim 10 (previously presented): The reactor of claim 9 wherein the total height of said prelift zone, said first reaction zone, said second reaction zone, and said outlet zone is in the range of from about 10 meters to about 60 meters.

Claim 11 (previously presented): The reactor of claim 9 wherein the diameter of said prelift zone is in the range of from about 0.02 meters and about 5 meters and the prelift zone height is in the range of from about 5% to about 10% of the height of the riser reactor.

Claim 12-13 (cancelled)

Claim 14 (currently amended): The reactor of claim 9 comprising an outlet zone and wherein the ratio of said outlet zone diameter to said first reaction zone diameter is in the range of from about 0.8:1 to about 1.5:1 and the height of said outlet zone is ~~generally~~ from about 0% to about 20% of the height of the riser reactor.

Claim 15 (previously presented): The reactor of claim 9 further comprising a first junction section between said first reaction zone and said second reaction zone, and wherein said first junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 30°~80°.

Claim 16 (currently amended): The reactor of claim 9 comprising an outlet zone and further comprising a second junction section between said second reaction zone and said outlet zone, and wherein said second junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 45°~85°.

Claim 17 (currently amended): A riser reactor configured for a fluidized catalytic conversion process to produce converted hydrocarbons, the reactor having a substantially vertical linear axis, a riser reactor height, and a reactor bottom, and wherein the riser reactor comprises in order from the reactor bottom:

a.) a prelift zone having a prelift zone diameter and a prelift zone height,

b.) a first reaction zone having a first reaction zone diameter and a first reaction zone height and wherein the first reaction zone is configured so that a hydrocarbon cracking reaction ~~taking~~ takes place,

c.) ~~the~~ a second reaction zone having a second reaction zone heighth and a second reaction zone diameter and wherein the ratio of said second reaction zone diameter to said first reaction zone diameter is in the range of from about 1.5:1 to about 5:1, said second reaction zone is configured so that a hydrocarbon conversion reaction ~~taking~~ takes place , and

d.) an optional outlet zone having an outlet zone diameter that is reduced with respect to the second reaction zone diameter.

Claim 18 (currently amended): The reactor of claim 17 wherein the total height of said prelift zone, said first reaction zone, said second reaction zone, and said optional outlet zone is in the range of from about 10 meters to about 60 meters.

Claim 19 (previously presented): The reactor of claim 17 wherein the diameter of said prelift zone is in the range of from about 0.02 meters and about 5 meters and the prelift zone height is in the range of from about 5% to about 10% of the height of the riser reactor.

Claim 20 (previously presented): The reactor of claim 17 wherein the ratio of the first reaction zone diameter to said prelift zone diameter is from about 1:1 to about 2:1 and the height of said first reaction zone is from about 10% to about 30% of the height of the riser reactor.

Claim 21 (previously presented): The reactor of claim 17 wherein the height of said second reaction zone is in the range of from about 30% to about 60% of the height of the riser reactor.

Claim 22 (currently amended): The reactor of claim 17 wherein the ratio of said outlet zone diameter to said first reaction zone diameter is in the range of from about 0.8:1 to about 1.5:1 and the height of said optional outlet zone is from about 0% to about 20% of the height of the riser reactor.

Claim 23 (previously presented): The reactor of claim 17 further comprising a first junction section between said first reaction zone and said second reaction zone, and wherein said first junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 30°~80°.

Claim 24 (currently amended): The reactor of claim 17 comprising said outlet zone and further comprising a second junction section between said second reaction zone and said outlet

zone, and wherein said second junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 45°~85°.

Claim 25 (currently amended): A fluidized catalytic conversion process including hydrocarbon cracking reactions on hydrocarbons in the riser reactor of claim 1 comprising:

a.) providing the riser reactor of claim 1,

b.) passing catalytic cracking catalyst and prelift medium into [[a]] the prelift zone having [[a]] the prelift zone diameter and [[a]] the prelift zone height ~~and containing~~ to transport the catalytic cracking catalyst to the first reaction zone without reacting a hydrocarbon in the prelift zone,

c.) passing catalytic cracking hydrocarbon feed and catalytic cracking catalyst from the prelift zone to [[a]] the first reaction zone having [[a]] the first reaction zone diameter and [[a]] the first reaction zone height to produce a first reaction zone product containing catalytic cracking catalyst, catalytic cracking hydrocarbon feed, and cracked hydrocarbon product,

d.) passing the first reaction zone product from the first reaction zone to [[a]] the second reaction zone having [[a]] the second reaction zone height and [[a]] the second reaction zone diameter that is larger than the first reaction zone diameter to produce a second reaction zone product containing catalytic cracking catalyst, catalytic cracking hydrocarbon feed, and cracked hydrocarbon product, and

e.) passing the second reaction zone product from the second reaction zone to [[an]] the optional outlet zone having [[an]] the outlet zone diameter that is reduced with respect to the second reaction zone diameter.

Claim 26 (currently amended): The process of claim 25 wherein the step of providing the reactor system ~~of claim 1~~ comprises providing a reactor system wherein the total height of said

prelift zone, said first reaction zone, said second reaction zone, and said optional outlet zone is in the range of from about 10 meters to about 60 meters.

Claim 27 (currently amended): The process of claim 25 wherein the step of providing the reactor system ~~of claim 1~~ comprises providing a reactor system wherein the diameter of said prelift zone is in the range of from about 0.02 meters and about 5 meters and the prelift zone height is in the range of from about 5% to about 10% of the height of the riser reactor, and wherein the step of passing catalytic cracking catalyst into said prelift zone comprises passing catalytic cracking catalyst into a prelift zone wherein the diameter of said prelift zone is in the range of from about 0.02 meters and about 5 meters and the prelift zone height is in the range of from about 5% to about 10% of the height of the riser reactor.

Claim 28 (cancelled)

Claim 29 (currently amended): The process of claim 25 wherein the step of providing the reactor system ~~of claim 1~~ comprises providing a reactor system wherein the ratio of said second reaction zone diameter to said first reaction zone diameter is in the range of from about 1.5:1 to about 5:1 and the height of said second reaction zone is in the range of from about 30% to about 60% of the height of the riser reactor and wherein the step of passing the first reaction zone stream from the first reaction zone to the second reaction zone and wherein the step of wherein the ratio of said second reaction zone diameter to said first reaction zone diameter is in the range of from about 1.5:1 to about 5:1 and the height of said second reaction zone is in the range of from about 30% to about 60% of the height of the riser reactor.

Claim 30 (currently amended): The process of claim 25 wherein the step of providing the reactor system ~~of claim 1~~ comprises providing a reactor system comprising the outlet zone wherein the ratio of said outlet zone diameter to said first reaction zone diameter is in the range of from about 0.8:1 to about 1.5:1 and the height of said optional outlet zone is from about 0% to about 20% of the height of the riser reactor.

Claim 31 (currently amended): The process of claim 25 wherein the step of providing the reactor system ~~of claim 1~~ comprises providing a reactor system further comprising a first junction section between said first reaction zone and said second reaction zone, and wherein said first junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 30°~80°.

Claim 32 (currently amended): The process of claim 25 wherein the step of providing the reactor system ~~of claim 1~~ comprises providing a reactor system further comprising said outlet zone and a second junction section between said second reaction zone and said outlet zone, and wherein said second junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 45°~85°.

Claim 33 (currently amended): A fluidized catalytic conversion process including hydrocarbon cracking reactions on hydrocarbons flowing ~~substantially from a~~ in a riser reactor ~~bottom~~ to produce converted hydrocarbons, in the riser reactor of claim 9, the reactor having a substantially vertical linear axis, a riser reactor height, and the reactor bottom, the process comprising the steps of:

a.) providing the riser reactor of claim 9,

b.) passing catalytic cracking catalyst and prelift medium into [[a]] the prelift zone having [[a]] the prelift zone diameter and [[a]] the prelift zone height ~~and containing~~ to transport the catalytic cracking catalyst to the first reaction zone without reacting hydrocarbon in the prelift zone,

c.) passing catalytic cracking hydrocarbon feed and catalytic cracking catalyst from the prelift zone to [[a]] the first reaction zone having [[a]] the first reaction zone diameter and [[a]] the first reaction zone height wherein the ratio of the first reaction zone diameter to said prelift zone diameter is from about 1:1 to about 2:1 and the height of said first reaction zone is from about 10% to about 30% of the height of the riser reactor and wherein the step of passing catalytic cracking hydrocarbon feed and catalytic cracking catalyst from the prelift zone to a first reaction zone comprises passing catalytic cracking hydrocarbon feed and catalytic cracking catalyst from the

prelift zone to a first reaction zone having a first reaction zone diameter to said prelift zone diameter from about 1:1 to about 2:1 and wherein the height of said first reaction zone is from about 10% to about 30% of the height of the riser reactor for a hydrocarbon cracking reaction in the first reaction zone at higher reaction temperatures, higher ratios of catalyst to oil, and shorter reaction times than, respectively, a reaction temperature, ratio of catalyst to oil, and reaction time in [[a]] the second reaction zone, to produce a first reaction zone stream containing catalytic cracking catalyst, catalytic cracking hydrocarbon feed, and cracked hydrocarbon product,

d.) passing the first reaction zone stream from the first reaction zone to the second reaction zone having [[a]] the second reaction zone height and [[a]] the second reaction zone diameter that is larger than the first reaction zone diameter wherein the ratio of said second reaction zone diameter to said first reaction zone diameter is in the range of from about 1.5:1 to about 5:1 and the height of said second reaction zone is in the range of from about 30% to about 60% of the height of the riser reactor and wherein the step of passing the first reaction zone stream from the first reaction zone to the second reaction zone and wherein the step of wherein the ratio of said second reaction zone diameter to said first reaction zone diameter is in the range of from about 1.5:1 to about 5:1 and the height of said second reaction zone is in the range of from about 30% to about 60% of the height of the riser reactor for a hydrocarbon cracking reaction in the second reaction zone at lower reaction temperatures, lower ratios of catalyst to oil, and longer reaction times than, respectively, the reaction temperature, ratio of catalyst to oil, and reaction time in the first reaction zone to produce a second reaction zone stream containing catalytic cracking catalyst and cracked hydrocarbon product, and, ~~and~~

e.) passing the second reaction zone stream from the second reaction zone to [[an]] the optional outlet zone having [[an]] the outlet zone diameter that is reduced with respect to the second reaction zone diameter.

Claim 34 (currently amended): The process of claim 33 wherein the step of providing the reactor system ~~of claim 9~~ comprises providing a reactor system wherein the total height of said

prelift zone, said first reaction zone, said second reaction zone, and said outlet zone is in the range of from about 10 meters to about 60 meters.

Claim 35 (currently amended): The process of claim 33 wherein the step of providing the reactor system ~~of claim 9~~ comprises providing a reactor system wherein the diameter of said prelift zone is in the range of from about 0.02 meters and about 5 meters and the prelift zone height is in the range of from about 5% to about 10% of the height of the riser reactor, and wherein the step of passing catalytic cracking catalyst into said prelift zone comprises passing catalytic cracking catalyst into a prelift zone wherein the diameter of said prelift zone is in the range of from about 0.02 meters and about 5 meters and the prelift zone height is in the range of from about 5% to about 10% of the height of the riser reactor.

Claim 36-37 (cancelled)

Claim 38 (currently amended): The process of claim 33 wherein the step of providing the reactor system ~~of claim 9~~ comprises providing a reactor system wherein the ratio of said outlet zone diameter to said first reaction zone diameter is in the range of from about 0.8:1 to about 1.5:1 and the height of said outlet zone is from about 0% to about 20% of the height of the riser reactor.

Claim 39 (currently amended): The process of claim 33 wherein the step of providing the reactor system ~~of claim 9~~ comprises providing a reactor system further comprising a first junction section between said first reaction zone and said second reaction zone, and wherein said first junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 30°~80°.

Claim 40 (currently amended): The process of claim 33 wherein the step of providing the reactor system ~~of claim 9~~ comprises providing a reactor system further comprising a second junction section between said second reaction zone and said outlet zone, and wherein said second junction section has a circular truncated cone shape with a vertical section vertex angle with respect to the reactor axis in the range of about 45°~85°.

Claim 41-48 (cancelled)

Claim 49 (new): The reactor of claim 1 further comprising a conduit adapted to introduce quenching medium between the first reaction zone and the second reaction zone and a source of quench medium.

Claim 50 (new): The reactor of claim 49 wherein the quenching medium comprises at least one member selected from the group consisting of quenching liquids, cooled regenerated catalyst, cooled semiregenerated catalyst, fresh catalyst, and their mixtures.

Claim 51 (new): The reactor of claim 50 wherein the quench medium comprises at least one quenching liquid selected from the group consisting of LPG, gasoline, LCCO, HCCO, water, and mixtures thereof.

Claim 52 (new): The reactor of claim 50 wherein the quench medium comprises regenerated catalyst having a residual carbon content of less than about 0.1% (wt).

Claim 53 (new): The reactor of claim 50 wherein the quench medium comprises semi-regenerated catalyst having a residual carbon content of at least 0.1% (wt) to about 0.9% (wt).

Claim 54 (new): The reactor of claim 49 further comprising a conjunct zone between the first reaction zone and the second reaction zone.

Claim 55 (new): The reactor of claim 49 comprising an outlet zone and further comprising a conduit adapted to introduce quenching medium between the second reaction zone and the outlet zone and a source of the quenching medium.

Claim 56 (new): The reactor of claim 1 further comprising a conduit adapted to introduce a reactable feedstock between the first reaction zone and the second reaction zone.

Claim 57 (new): The reactor of claim 1 further comprising a heat exchanger between the first reaction zone and the second reaction zone adapted to cool at least a portion of hydrocarbon and catalyst passing between the first reaction zone and the second reaction zone.

Claim 58 (new): The reactor of claim 1 further comprising a conduit adapted to introduce fresh catalyst between the first reaction zone and the second reaction zone and a source of the fresh catalyst.